RUST GEOTECH INC.

Spectral Gamma-Ray Borehole
Log Data Report

Borehole 60-11-07

Log Event A

Borehole Information

Farm : U	**Tank :** U-111	**Site Number :** 299-W18-110
N-Coord : 37,857	**W-Coord :** 75,763	**TOC Elevation :** 665.65
Water Level, ft :	**Date Drilled :** 5/31/1974	

Casing Record

Type : Steel-welded	Thickness, in. : 0.280	ID, in. : 6
Top Depth, ft. : 0	Bottom Depth, ft. : 125	

Borehole Notes:

This borehole was drilled in May 1974 and completed with 6-in., schedule-40 steel tubing with a wall thickness of 0.280-in. to a depth of 125 ft. The top of the casing is approximately 0.4 ft above the ground surface. There is no mention in the drilling log about the casing being perforated or any mention of cement placed in the bottom of the hole. The drilling log mentioned that from 40 to 50 ft the material was very hard, packed, and powdery.

Equipment Information

Logging System : 2	**Detector Type :** HPGe	**Detector Efficiency:** 35.0 %
Calibration Date : 10/1995	**Calibration Reference :** GJPO-HAN-3	**Logging Procedure :** P-GJPO-1783

Log Run Information

Log Run Number :	1	**Log Run Date :**	12/7/1995	**Logging Engineer:**	Alan Pearson
Start Depth, ft.:	0.0	**Counting Time, sec.:**	100	**L/R :** L **Shield :**	N
Finish Depth, ft. :	14.0	**MSA Interval, ft. :**	0.5	**Log Speed, ft/min.:**	n/a

Log Run Number :	2	**Log Run Date :**	12/8/1995	**Logging Engineer:**	Alan Pearson
Start Depth, ft.:	122.0	**Counting Time, sec.:**	100	**L/R :** L **Shield :**	N
Finish Depth, ft. :	95.0	**MSA Interval, ft. :**	0.5	**Log Speed, ft/min.:**	n/a

Log Run Number :	3	**Log Run Date :**	12/8/1995	**Logging Engineer:**	Alan Pearson
Start Depth, ft.:	123.0	**Counting Time, sec.:**	100	**L/R :** L **Shield :**	N
Finish Depth, ft. :	58.0	**MSA Interval, ft. :**	0.5	**Log Speed, ft/min.:**	n/a

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Log Event A

Log Run Number :	4	**Log Run Date :**	12/11/1995	**Logging Engineer:**	Alan Pearson
Start Depth, ft.:	59.0	**Counting Time, sec.:**	100	**L/R :** L	**Shield :** N
Finish Depth, ft. :	13.0	**MSA Interval, ft. :**	0.5	**Log Speed, ft/min.:**	n/a

Log Run Number :	5	**Log Run Date :**	12/11/1995	**Logging Engineer:**	Alan Pearson
Start Depth, ft.:	0.0	**Counting Time, sec.:**	100	**L/R :** L	**Shield :** N
Finish Depth, ft. :	11.0	**MSA Interval, ft. :**	0.5	**Log Speed, ft/min.:**	n/a

Analysis Information

Analyst : E.P. Baumgartner

Data Processing Reference : P-GJPO-1787 Analysis Date : 6/10/1996

Analysis Notes :

This borehole was logged in five log runs using the Spectral Gamma Logging System (SGLS), with log run 5 being the repeat log for tank U-111. Log run 2 had a depth error and is not usable. The pre- and post-survey field verification spectra show consistent activities, indicating the logging system operated properly during data collection. Energy calibrations differed because of gain drift in the instrumentation. Gain drifts during data collection necessitated energy versus channel number recalibrations during processing of the data to maintain proper peak identification. Logging overlaps, where data were collected on separate days at the same depth, occurred in this borehole at about 14 and 58 ft. Repeatability was good for the overlap log section at 14 ft, being within the statistical uncertainties. The log overlap at 58.0, 58.5, and 59 ft shows a considerable offset in both the U-238 and the total gamma logs. Log run 3 began at 123.0 ft and ended at 58.0 ft. Log run 4 began at 59.0 ft and ended at 13.0 ft. The total gamma gross count for log run 4 was 15 percent greater than the total gamma gross count for log run 3 over the three overlap intervals. An increase in the U-238 log was also seen in this overlap interval with log run 4 again being higher.

Man-made Cs-137 and processed uranium radionuclides were identified in this borehole. The presence of Cs-137 was measured continuously from the ground surface to 8.0 ft. The highest concentration of Cs-137, about 4 pCi/g, was measured at the surface. A subsurface zone of Cs-137 contamination occurs from 0.5 to 6.0 ft with a peak concentration of about 3 pCi/g at a depth of 2.5 ft. There was no measurable concentration of Cs-137 at the very bottom of the hole.

There was evidence of processed uranium at a depth of about 63 ft. Both the U-235 and Pa-234M (from U-238) gamma-ray energies were detected over two measurement intervals.

Additional information and interpretations of log data are included in the main body of the Tank Summary Data Report for tank U-111.

Log Plot Notes:

Separate log plots show the man-made (e.g., Cs-137) and the naturally occurring radionuclides (K-40, U-238, and Th-232). The natural radionuclides can be used for lithologic interpretations. The headings of these plots identify the energy of the specific gamma peaks used to calculate the concentrations.

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A combination plot includes the man-made radionuclides, the naturally occurring radionclides, the total gamma count derived from the SGLS and the Westinghouse Hanford Company (WHC) Tank Farms gross gamma log. The gross gamma plot displays the latest available digital data from WHC with no attempt to adjust the depths to coincide with the SGLS data.

Uncertainty bars on the plots show the statistical uncertainty for the calculated concentrations at the 95-percent confidence level. The minimum detection level (MDL) is shown by open circles on the plots. The MDL of a radionuclide represents the lowest concentration at which positive identification of a gamma-ray peak is statistically defensible.